REMARKS

This application has been reviewed in light of the Office Action dated December 4, 2002. Claims 1, 4-22, 31-33, 45-47, and 51-56 are now pending in this application. Claims 2, 3, 23-30, 34-44, and 48-50 have been cancelled, without prejudice or disclaimer of the subject matter presented therein. Claims 51-56 have been added to provide Applicants with a more complete scope of protection. Claims 1, 7, 9, 10, 12, and 31-33 have been amended to define still more clearly what Applicants regard as their invention.[1] Claims 1, 7, 9, 53, and 55 are independent. Favorable reconsideration is requested in view of the following comments.

Claims 31-33 were objected to because, according to the Office Action, the phrase "said film" has no antecedent basis. Claims 31-33 have been amended as deemed necessary to overcome this objection, and thus withdrawal of the objection is respectfully requested.

Claims 23-37 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent 6,342,754 B1 (Kuroda et al.), and Claims 1-15 were rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent 4,769,575 (Murata et al.) in view of U.S. Patent 4,363,648 (Allaire et al.). Claims 16-22 and 38-50 were rejected under 35 U.S.C. § 103(a) as obvious over Murata et al. in view of Allaire et al., and further in view of Kuroda et al.

1/ The presently pending claims incorporate the amendments made by the Examiner in the Examiner's Amendment attached to the Notice of Allowance dated March 12, 2002.

Applicants note that the line numbers recited in section 2 of the Examiner's Amendment appear to refer to line numbers of the specification pages, for some of the claim changes made by the Examiner, and to line numbers of the individual claims themselves, for other ones of those claim changes. In order to rectify this discrepancy, the Examiner is respectfully requested to clarify for the record which particular portions of the relevant claims have been amended by the mentioned Examiner's Amendment.

Initially, cancellation of Claim 2, 3, 23-30, 34-44, and 48-50 renders their rejection moot.

Amended independent Claim 1 is directed to an electron beam apparatus comprising a first substrate that includes a plurality of electron-emitting devices, provided in a vacuum container, and a second substrate that is located opposite said first substrate and that has a region irradiated by electrons emitted by the electron-emitting devices in the vacuum container. At least one spacer is mounted as an atmospheric-pressure resistant structure, that is sandwiched directly between the first and second substrates, or indirectly via an intermediate member between the first and second substrates, and that is extended longitudinally in a direction perpendicular to the direction in which the first and second substrates are positioned opposite each other. The apparatus also comprises a support member for supporting the spacer outside an electron-emitting region that is defined between a region of the first substrate wherein the electron-emitting devices are located, and a region of the second substrate that is irradiated by the electrons. The spacer has, in a vicinity of an end in the longitudinal direction, a portion shorter in a width direction of a gap between the first and second substrates rather than in another direction.

A notable feature of Claim 1 is that the spacer has, in a vicinity of an end thereof, a portion shorter in a direction along which substrates are opposed to each other rather than in other directions. Support for this feature is found in, for example, Figs. 3, 8, and 9, element 1023.[2]

Amended independent Claim 7 is directed to an electron beam apparatus

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2/ Of course, the mentioned features are not to be construed as being limited to only the drawings and element referred to above, and those drawings and element are mentioned for illustration purposed only.

comprising a first substrate that includes a plurality of electron-emitting devices, provided in a vacuum container, and a second substrate that is located opposite the first substrate and that has a region irradiated by electrons emitted by the electron-emitting devices. At least one spacer is mounted as an atmospheric-pressure resistant structure that is sandwiched directly between the first and second substrates, or indirectly via an intermediate member between the first and second substrates, and that is extended longitudinally in a direction perpendicular to the direction in which the first and second substrates are positioned opposite each other. The apparatus also comprises a support member that, outside an electron-emitting region that is defined between a region of the first substrate wherein the electron-emitting devices are located and the region on the second substrate that is irradiated by the electrons, is mounted on the substrate whereon the spacer is provided so that the support member supports the spacer. The support member and spacer are secured to each other, so that a direction in parallel to a mounting surface of the substrate on which the supporting member is mounted, is in parallel to the longitudinal direction of the spacer, and so that a mapage of the spacer in a direction along which the first and second substrates are opposed to each other is straightened.

Support for the features of Claim 7 is found in the specification and drawings as originally filed, at least in the description of Embodiment 4.

As amended, independent Claim 9 is directed to an electron beam apparatus comprising a first substrate that includes a plurality of electron-emitting devices, provided in a vacuum container, and a second substrate that is located opposite the first substrate and that has a region irradiated by electrons emitted by the electron-emitting devices. At least one spacer is mounted as an atmospheric-pressure resistant structure, that is sandwiched

directly between the first and second substrates, or indirectly via an intermediate member between the first and second substrates, and that is extended longitudinally in a direction perpendicular to the direction in which the first and second substrates are positioned opposite each other. The apparatus also comprises a support member, for supporting the spacer outside an electron-emitting region that is defined between a region of the first substrate wherein the electron-emitting devices are located, and a region of the second substrate that is irradiated by the electrons. The spacer has a thermal expansion rate that is smaller than a thermal expansion rate of the substrate.

Murata et al. relates to an image display apparatus using an electron gun. Glass enclosure 11, rear electrode parts 12, 13, line cathodes 2 as sources of electron beams, vertical convergence electrodes 3, 3', vertical deflection electrodes 4, electron beam flow control electrodes 5, a horizontal convergence electrode 6, horizontal deflection electrodes 7, a horizontal convergence electrode 6', electron beam acceleration electrodes 8, an anode 9, and glass enclosure 10, 11 are disposed from rear to front in the mentioned order. All the components are enclosed in the glass enclosure 10 and 11, and the glass enclosure is evacuated. See col. 3, lines 9-23. Col. 4, lines 31-46 refers to a flat plate 12 and spacers 13 made of glass plates, and an electron gun "which surround the line cathodes" formed by a flat plate type rear electrode 12, wherein a conductive film 12a is formed on one surface, glass spacers 13 wherein both edges 13b of a surface which contacts with electrode 3 are chambered to isolate it from electrode 3, and conductive films 13a are formed on a whole surface of the opposite surface of the spacer 13 in order to keep conductivity with the rear electrode 12.

Allaire et al. relates to a structure comprising supporting means and means

for fixing the supporting means. Col. 3, lines 6-9 refers to a pair of opposed vane supports 30, 32 fixedly secured in position relative to base plate 14, such as by frit material 24, so as to lie substantially parallel with end panels 20. Vane supports 30 and 32 have a rearward base portion 34 and a forwardly extending notched portion 36 spaced from the base panel 14. The notched portion 36 has a plurality of vane-receiving notches or slots 38 formed in its forward face and extending vertically therethrough. A pair of vane supports 40 are secured in position relative to face plate 16 in vertical alignment above vane supports 30 and 32. Col. 3, beginning at line 65, states that prior to positionment of the face plate panel 16 upon the end and side panels, support vanes 28 are initially held in position by vane supports 30, 32 and various electronic components which may be positioned therebetween.

In Applicants' view, the Allaire et al. supporting means is a spacer itself, rather than a member for supporting a spacer. Indeed, nothing has been found, or pointed out, in either Murata et al. or Allaire et al., that would teach or suggest a support member and a spacer secured to each other, so that a direction in parallel to a mounting surface of a substrate on which the supporting member is mounted, is in parallel to the longitudinal direction of the spacer, and so that a mapage of the spacer in a direction along which first and second substrates are opposed to each other is straightened, as recited in Claim 7. Nor are those references seen to teach or suggest a spacer having, in a vicinity of an end in a longitudinal direction, a portion shorter in a width direction of a gap between first and second substrates rather than in another direction, as recited in Claim 1, or a spacer having a thermal expansion rate that is smaller than a thermal expansion rate of a substrate, as recited in Claim 9.

For the foregoing reasons, Applicants respectfully submit that Claims 1, 7,

and 9 are each clearly patentable over Murata et al. and Allaire et al., whether considered separately or in combination.

Added independent Claim 53 recites features relating to fixing a spacer to a supporting member, the spacer being in a state in which a mapage thereof is straightened, and added independent Claim 55 recites fixing a spacer to a supporting member supporting the spacer in a state that the spacer is weighted.

In Applicants view, neither Murata et al. nor Allaire et al. is seen to teach or suggest those features, and thus Claims 53 and 55 are each deemed clearly patentable over Murata et al. and Allaire et al., whether considered separately or in combination.

A review of the other art of record, including Kuroda et al., has failed to reveal anything that, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as applied against the independent claims herein. Therefore, those claims are respectfully submitted to be patentable over the art of record.

The other rejected claims in this application depend from one or another of the independent claims discussed above, and therefore are submitted to be patentable for at least the same reasons as are those independent claims. Since each dependent claim is also deemed to define an additional aspect of the invention, individual consideration or reconsideration, as the case may be, of the patentability of each claim on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and the allowance of the present application.

No petition to extend the time for response to the Office Action is deemed necessary for the present Amendment. If, however, such a petition is required to make this

Amendment timely filed, then this paper should be considered such a petition and the Commissioner is authorized to charge the requisite petition fee to Deposit Account 06-1205.

Applicants' undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Twice Amended) An electron beam apparatus comprising:

a first substrate that [is provided in a vacuum container and that] includes a plurality of electron-emitting devices, provided in a vacuum container;

a second substrate that [in said vacuum container] is located opposite said first substrate and that [is] has a region irradiated by electrons emitted by said electron-emitting devices in said vacuum container;

at least one spacer[, at least,] that is mounted as an atmospheric-pressure resistant structure [on one of said first and second substrates], that is sandwiched directly between said first and second substrates, or indirectly via an intermediate member between said first and second substrates, and that is extended longitudinally in a direction perpendicular to the direction in which said first and second substrates are positioned opposite each other; and

a support member, for supporting said spacer outside an electron-emitting region that is defined between a region of said first substrate wherein said electron-emitting devices are located, and a region of said second substrate that is irradiated by said electrons,

wherein [at least] said spacer [or said support member] has [reduces or relieves the stress that is generated when said spacer is sandwiched between said first and second substrates], in a vicinity of an end in a longitudinal direction, a portion shorter in a

width direction of a gap between said first and second substrates rather than in another direction.

2. (Canceled)

3. (Canceled)

7. (Twice Amended) An electron beam apparatus comprising:

a first substrate that [is provided in a vacuum container and that] includes a plurality of electron-emitting devices, provided in a vacuum container;

a second substrate that [in said vacuum container] is located opposite said first substrate and that [is] has a region irradiated by electrons emitted by said electron-emitting devices;

at least one spacer[, at least,] that is mounted as an atmospheric-pressure resistant structure [on one of said first and second substrates,] that is sandwiched directly between said first and second substrates, or indirectly via an intermediate member between said first and second substrates, and that is extended longitudinally in a direction perpendicular to the direction in which said first and second substrates are positioned opposite each other; and

a support member that, outside an electron-emitting region that is defined between a region of said first substrate wherein said electron-emitting devices are located and [a] the region on said second substrate that is irradiated by said electrons, is mounted on said substrate whereon said spacer is provided so that said support member supports

said spacer,

wherein said support member and said spacer are secured to each other, so that a [first axis of said support member, which is positioned] direction in parallel to [the face of said support member that is mounted on] a mounting surface of said substrate on which said supporting member is mounted, is [substantially] in parallel to [a second axis of said spacer that is extended in said] a longitudinal direction of said spacer, and that a mapage of said spacer in a direction along which said first and second substrates are opposed to each other is straightened.

9. (Twice Amended) An electron beam apparatus comprising:

a first substrate that [is provided in a vacuum container and that] includes a plurality of electron-emitting devices, provided in a vacuum container;

a second substrate that [in said vacuum container] is located opposite said first substrate and that [is] has a region irradiated by electrons emitted by said electron-emitting devices;

at least one spacer[, at least,] that is mounted as an atmospheric-pressure resistant structure [on one of said first and second substrates], that is sandwiched directly between said first and second substrates, or indirectly via an intermediate member between said first and second substrates, and that is extended longitudinally in a direction perpendicular to the direction in which said first and second substrates are positioned opposite each other; and

a support member, for supporting said spacer outside an electron-emitting

region that is defined between a region of said first substrate wherein said electron-emitting devices are located, and a region of said second substrate that is irradiated by said electrons,

wherein said spacer has a thermal expansion rate that is smaller than a thermal expansion rate of said substrate [on which said spacer is mounted].

10. (Amended) An electron beam apparatus according to claim 9, wherein a difference between the thermal expansion ratio of said substrate [on which said spacer is mounted] and the thermal expansion ratio of said spacer does not exceed 5%.

12. (Amended) An electron beam apparatus according to claim 11, wherein, while said support member is fixed to said spacer, said support member is fixed, [together with said spacer,] to said substrate [on which said spacer is to be mounted].

23.-30. (Canceled)

31. (Amended) An electron beam apparatus according to claim 1, wherein said electron-emitting devices are connected by wiring laid on said first substrate, and [said] a film formed on said spacer is electrically connected to said [first substrate by said] wiring.

32. (Amended) An electron beam apparatus according to claim 7, wherein

said electron-emitting devices are connected by wiring laid on said first substrate, and [said] a film formed on said spacer is electrically connected to said first substrate by said wiring.

33. (Amended) An electron beam apparatus according to claim 9, wherein said electron-emitting devices are connected by wiring laid on said first substrate, and [said] a film formed on said spacer is electrically connected to said first substrate by said wiring.

34.-44. (Canceled)

48.-50. (Canceled)